STEAM INHALER

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a steam generating device, and more particularly to a steam inhaler.

[0003] 2. Description of the Prior Art

[0004] A steam inhaler is a device for generating vapor by heating a tank of water by means of a heater. Conventionally, during operation, generated vapor is ejected and causes a medicinal liquid contained in a suction tank sucked up and atomized for inhalation into a patient's mouth for medical treatment or skin caring purpose.

[0005] There are a variety of steam inhalers known in the prior arts. Examples include the atomizing apparatus in U.S. Patent No. 4,318,397, the inhalator in U.S. Patent No. 4,604,999 and the steam inhaler in U.S. Patent No. 4,942,874. Those prior arts possess different structures.

[0006] In some steam inhalers, because the arrangement of components is not good, in operation, some of the processes including the vaporization of water, ejection of vapor and/or suction of medicinal liquid are not ideal, and therefore the steaming effect is not poor. Although some conventional steam inhalers have improved structures, the structures are very complicated. Hence the assembly of the steam inhaler is complex and maintenance is not easy.

[0007] Also, most manufacturers usually do not put much effort in designing the vapor channels that are critical for good ejection of vapor. When vapor is generated and conveyed through the defective vapor channels, it is obstructed to produce a smooth ejection. Moreover, as the vapor is conveyed to the nozzle and

ejected therefrom, hot dew is easily formed in the vicinity of the nozzle because of the structure of the nozzle. Such a phenomenon results to poor vapor atomization.

SUMMARY OF THE INVENTION

[0008] Because of the aforesaid defects of the conventional steam inhaler, thus a primary object of the present invention is to provide a steam inhaler comprising a water tank, a heating chamber, a heater and a vapor chamber. With the good arrangement of the components, water is vaporized and flows through vapor passages smoothly, and is ejected from the nozzle.

[0009] Another object of the present invention is to provide a steam inhaler that possesses a rotatable nozzle, such that a user can adjust the ejecting direction for completely receiving the vapor.

[0010] A further object of the present invention is to provide a steam inhaler with an improved nozzle. The nozzle possesses a dew proof annulus that can reduce the formation of hot dew.

[0011] To achieve the above and other objects, in accordance with the present invention, there is provided with a steam inhaler comprising a water tank, a heating chamber arranged at a lateral side of the water tank, a heater which is mounted at an external side wall of the heating chamber for heating up the water in the heating chamber to generate vapor, a vapor chamber arranged at the front side of the water tank with a vapor inlet in communication with the heating chamber such that vapor generated in the heating chamber flows to the vapor chamber, a connecting arm for conveying the vapor from the heating chamber, and a nozzle which atomizes the vapor transported via the connecting arm.

[0012] Preferably, the nozzle is an angle adjustable structure. The nozzle includes a rotatable cylinder with a vapor outlet port. Vapor passes through an internal passage and the vapor outlet port of the rotatable cylinder to a nozzle

head.

[0013] More preferably, the present invention further includes a pair of ion electrodes correspondingly arranged at an inner wall of the connecting arm and projecting into an internal passage of the connecting arm. Also, a negative ion generator is provided at a negative ion outlet in the vicinity of the nozzle for generating negative ions. The negative ion generator is embedded in the negative ion outlet. Alternatively, the negative ion generator is detachable from the steam inhaler.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The present invention will be apparent to those skilled in the art by reading the following description of the best mode and a preferred embodiment of a device for carrying out the present invention, with reference to the attached drawings, in which:

[0015] **Fig. 1** is a perspective view of a steam inhaler constructed in accordance with the present invention;

[0016] **Fig. 2** is an exploded view showing the components of the steam inhaler;

[0017] **Fig. 3** is a perspective side view showing a heating chamber and a heater of the steam inhaler;

[0018] **Fig. 4** is a sectional view taken along line **4-4** of **Fig. 1**;

[0019] **Fig. 5** is a top schematic view of the steam inhaler;

[0020] **Fig. 6** is an exploded view of a first embodiment of the steam inhaler constructed in accordance with the present invention, in which the steam inhaler is provided with an external housing;

[0021] **Fig. 7** is a front perspective view of the steam inhaler of **Fig. 6** in assembly;

[0022] **Fig. 8** is a top schematic view showing a cover, connecting arm and nozzle;

[0023] **Fig. 9** is an exploded view showing the components of the nozzle;

[0024] **Fig. 10** is a sectional view taken along line **10-10** of **Fig. 8**;

[0025] **Fig. 11** is a sectional view taken along line **11-11** of **Fig. 8**;

[0026] **Fig. 12** is an enlarged sectional view of a dew proof annulus of the steam inhaler;

[0027] **Fig. 13** is an enlarged sectional view of a negative ion generator of the steam inhaler;

[0028] **Fig. 14** is a partial sectional view showing that a draining control rod is inserted into a horizontal sleeve at the bottom of a water tank;

[0029] **Fig. 15** is an exploded view of a second embodiment of the steam inhaler constructed in accordance with the present invention, in which the steam inhaler is provided with an external housing; and

[0030] **Fig. 16** is a front perspective view of the steam inhaler of **Fig. 15** in assembly.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0031] With reference to the drawings and in particular to **Figs. 1** to **3**, **Fig. 1** shows a perspective view of a steam inhaler of the present invention; **Fig. 2** is an exploded view showing the components of the steam inhaler; **Fig. 3** is a

perspective side view of the steam inhaler. The steam inhaler **100** comprises a water tank **1** with an open top for storage of water.

[0032] Arranged at a front side of the water tank **2** is a vapor chamber **2** with an open top. A heating chamber **11** is arranged at a lateral side of the water tank **1** that is provided with at least one opening **12** at the lower part in communication with the heating chamber **11**. A vapor inlet **21** is formed at the side wall of the vapor chamber **2** in communication with the heating chamber **11**.

[0033] The tops of the water tank **1** and the vapor chamber **2** are covered by a cover **3** that is mounted with a connecting arm **31**. The connecting arm **31** is in connection with a nozzle **4**.

[0034] As shown in **Fig. 3**, a heater **5** is provided at an external side wall of the heating chamber **11** for heating up the water in the heating chamber **11**. Water is boiled and vaporized. The vapor passes through the vapor inlet **21** to the vapor chamber **2**, and then flows via the connecting arm **31** to the nozzle **4** for atomization.

[0035] Please refer to **Figs. 4** to **6**. **Fig. 4** is a sectional view taken along line **4-4** of **Fig. 1**; **Fig. 5** is a top schematic view of the steam inhaler; **Fig. 6** is an exploded view of a first embodiment of the steam inhaler in accordance with the present invention, in which the steam inhaler is provided with an external housing.

[0036] A feeding tank **6** is mounted at a rear side of the water tank **1**. A user can fill in water via a mouth **61** which is covered by a lip **62**. The lip **62** may be formed with threads and screwed to the mouth **61**. The lower part of the feeding tank **6** is communicated with the water tank **1**. When the feeding tank **6** is filled with water, water flows to the water tank **1** freely. Accordingly, the water tank **1** and the feeding tank **61** have the same water level.

[0037] Please also refer to **Fig. 4**. As shown, the feeding tank **6** is formed with an overflow channel **63** and a leading trough **64** surrounding an upper edge

of the feeding tank **6**. When too much water is filled in exceeding the capacity of the feeding tank **6**, excess water is guided to flow into the leading trough **64** and flows out through the overflow channel **63**. Furthermore, a see-through water level gauge **65** is provided at a lateral side of the feeding tank **6** for observing the water level in the feeding tank **6**, such that the user can check the amount of residual water in the feeding tank **1**.

[0038] Also, the steam inhaler **100** is provided with an external housing designed in accordance with requirements. As shown in the first embodiment of the steam inhaler in **Fig. 6**, the housing may be comprised of a front casing **71** and a rear casing **72**. The front casing **71** is formed with a negative ion outlet **711** in the vicinity of the nozzle **4**. A negative ion generator **8** is embedded in the negative ion outlet **711**.

[0039] **Fig. 7** is a perspective front view of the steam inhaler of **Fig. 6**. A display **73** is disposed at an appropriate position of the front casing **71** for displaying the operating status of the steam inhaler **100**. A power switch **74** is provided for turning on/off of the steam inhaler **100**. Also, an ion vapor button **75** is provided for starting or terminating the generation of ions, and a negative ion vapor button **76** is provided for starting or terminating the generation of negative ions.

[0040] Please refer to **Figs. 8** to **11**. **Fig. 8** is a schematic top view showing a cover plate, a connecting arm and a nozzle; **Fig. 9** is an exploded view showing the components of the nozzle; **Fig. 10** is a sectional view taken along line **10-10** of **Fig. 8**; **Fig. 11** is a sectional view taken along line **11-11** of **Fig. 8**.

[0041] The nozzle **4** comprises a rotatable cylinder **41** that is formed with an internal passage **410** therein. The rotatable cylinder **41** has an open end for connection to an upper end of the connecting arm **31** by a conventional way of engagement that allows free rotation. A sealing ring **311** is sandwiched between the connecting arm **31** and rotatable cylinder **41** to prevent leakage.

[0042] The other end of the rotatable cylinder **41** is closed and formed with a shaft **411** projecting out from the rotatable cylinder **411**. A stand **42** is fastened on the cover **3** and formed with a bore **421** for insertion of the shaft **411**. By means of the engagement between the bore **421** and the shaft **411**, the rotatable cylinder **41** is supported and secured at a predetermined position of the steam inhaler **100** and is able to rotate around a central axis of the shaft **411**.

[0043] Moreover, a locking pin **412** is formed at the close end of the rotatable cylinder **41** adjacent to the shaft **411**. A restricting channel **422** is formed at the stand **422** corresponding to the locking pin **412**, such that when the locking pin **42** passes through the restricting channel **422**, it is restricted to move within the restricting channel **422**. Thereby, when the user turns the rotatable cylinder **41**, the rotatable cylinder **41** is restricted to rotate within an allowable range of angle.

[0044] At the middle section of the rotatable cylinder **41**, a vapor outlet port **43** is formed. The vapor outlet port **43** is mounted in sequence with an annulus **44**, a sealing ring **45**, a dew proof annulus **46** and a nozzle head **47**. By means of the arrangement, the vapor that flows to the rotatable cylinder **41** from the vapor chamber **2** via the connecting arm **31** is conveyed to the vapor outlet port **43** and finally atomized from a central opening **471** at a front end of the nozzle head **47**.

[0045] **Fig. 12** is an enlarged sectional view of the dew proof annulus of the steam inhaler. The dew proof annulus **46** is made of aluminium or stainless steel and is formed with a concentric U-shaped section **461**. The concentric U-shaped section **461** defines a space therein and has an open end and a close end. The dew proof annulus **46** is also formed with a central through hole **463** along the axial direction.

[0046] When vapor is conveyed to an inflow end **465** of the central through hole **463** of the dew proof annulus **46** and flows out from an outflow end **466**, because of the structure of the dew proof annulus **46**, the formation of hot dew is largely reduced.

[0047] Besides, a part of the central though hole **463** near the outflow end **466** is formed with a rough inner surface **464** in sawtooth form, preventing the condensed droplets to be carried away by the vapor flowing therethrough.

[0048] Also, a pair of ion electrodes **32, 33** are correspondingly arranged at an inner wall of the connecting arm **31**. The ion electrodes **32, 33** project into an internal passage of the connecting arm **31** and are connected with electrical wires to a control circuit (not shown). As vapor flows through the connecting arm **31**, it is ionized by the ion electrode **32, 33** and forms ions. Thereby, the steam inhaler can generate vapor containing ions.

[0049] **Fig. 13** is an enlarged sectional view of the negative ion generator of the present invention. The negative ion generator **8** comprises an annular body **81** with an internal space. A first electrode **82** is disposed in the center of the annular body **81**, and a second electrode **83** is positioned near to the first electrode **82**. The first and second electrodes **82, 83** are connected respectively to a circuit board **84** by wires. The control circuit on the circuit board **84** controls the negative ion generator 8 to generate negative ions, and thereby the steam inhaler **100** is able to generate vapor with negative ions. Thus, the user can select pure vapor, vapor containing ions, or vapor containing negative ions in accordance with his requirements.

[0050] Please refer to **Fig. 6**. The steam inhaler **100** comprises a base **91** at the bottom. The base **91** is formed with a chamber **92** for accommodating a drip tray **93** putting in from a lateral opening. An aperture **921** is formed at the top of the chamber **92**.

[0051] A longitudinal horizontal sleeve **13** is formed at the bottom of the water tank **1**, which is communicated with a draining hole **14**. The draining hole **14** is positioned in correspondence with the aperture **921** at the chamber **92**.

[0052] A draining control rod **94,** which comprises a diametrical perforation **95,** is inserted into the horizontal sleeve **13**. When the draining control rod **94** is

put in the sleeve **13** at a second position, the diametrical perforation **95** is aligned with the draining hole **14**, forming a continuous passage. As shown in **Fig. 14**, to prevent water leakage, a conventional waterstop rubber **961** is mounted around the draining control rod **94** in the vicinity of the diametrical perforation **95**, and a sealing ring **962** is mounted around the draining control rod **94** contacting the horizontal sleeve **13**. The draining control rod **94** protrudes out of a side wall **101** of the steam inhaler **100** and is mounted with a rotatable drain button **97** to control the draining control rod **94** for drainage of water.

[0053] When the draining control rod **94** is at a first position, the perforation **95** is aligned perpendicularly to the draining hole **14**. Therefore, water is not able to drain from the perforation **95**. When the user turns the draining control rod **94** to the second position by means of the rotating drain button **97**, the perforation **95** is aligned with the draining hole **14** and forms a continuous passage. Accordingly, water in water tank **1** drains through the perforation **95** and draining hole **14**. Subsequently, water is conveyed through the aperture **921** to the drip tray **93** in the chamber **92**.

[0054] **Fig. 15** is an exploded view of a second embodiment of the steam inhaler in accordance with the present invention and **Fig. 16** is a front perspective view of the steam inhaler of **Fig. 15** in assembly. In the embodiment, the steam inhaler **100** is mounted with a detachable negative ion generator **8a**. The user can assemble the negative ion generator **8a** with the steam inhaler **100** or remove the negative ion generator **8a** from the steam inhaler **100** according to his requirements. The other components of the steam inhaler **100** are same as that in the first embodiment as shown in **Figs. 6** and **7**.

[0055] Although the present invention has been described with reference to the preferred embodiments thereof, it is apparent to those skilled in the art that a variety of modifications and changes may be made without departing from the scope of the present invention which is intended to be defined by the appended claims.